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## STUDIES IN SYRPHIDÆ—IV. SPECIES OF ERISTALIS NEW TO AMERICA, WITH NOTES ON OTHERS.

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It is well known that numerous species of insects first described from Europe have since been found to occur in North America. This is perhaps true to a larger extent in the Syrphidæ than in any other dipterous family, as not only are the syrphids very active on the wing, but they are also more independent in their food habits than are most insects. Many of them are predaceous in the larval stage, feeding on soft-bodied insect larvæ and aphids, while others pass the larval stage in decayed wood or in water containing decaying matter. The general distribution of these makes it possible for many of the syrphids to find suitable conditions for life over wide areas. Thus *Eristalis tenax* (L.) has attained to a world-wide distribution, as sewage and other filth in which it may breed occur everywhere. A few other species are also widely distributed in both hemispheres and many more are circumpolar.

Even species which are more limited in the matter of food may sometimes be transported, as is the case with *Merodon equestris* (Fab.), parasitic in bulbs of liliaceous plants. This European species has been repeatedly taken on both the Atlantic and Pacific coasts and is possibly established in some localities.

In the present paper the writer wishes to report the occurrence of two more well-known European species in America and to establish a third hitherto reported doubtfully.

### ***Eristalis arbustorum* (Linne).**

The attention of the writer was first attracted to the presence of this species in America in the summer of 1910 when, on July 10 a number of specimens were taken at Ft. Lee, N. J. The flies were common about the flowers of the wild carrot, but only a few were taken as they were supposed to be only the common *E. meigenii* Wiedemann. On pinning them, however, it was noticed that the

females especially looked somewhat different from *meigenii*, and on comparing them with specimens of *E. arbustorum* from Europe in my collection they were found to belong to the latter species. I then looked over my series of *meigenii* very carefully, with the result that a number of *arbustorum* were discovered, some of them dating as far back as 1906.

A few days later the above locality was revisited, when I collected about fifty specimens, males and females about equally represented. After this, for a time, I took all the specimens of both *meigenii* and *arbustorum* that came in my way, with the result that the latter species soon became much better represented in my collection than the former.

Also, on looking through the collections of the American Museum of Natural History, the Museum of the Brooklyn Institute of Arts and Sciences, the Staten Island Museum and the Cornell University collection, as well as a number of private collections, I found numerous specimens of *arbustorum* masquerading as *meigenii*.

A short time ago Mr. Frederick Knab of the National Museum at Washington wrote to me in regard to the occurrence of *E. arbustorum* in America, as he had found a specimen so labelled in Coquillett's writing in the collections of that museum. This reminded me that it was time some mention of the occurrence of this species in America should be made in print.

From my own observations and from the personal study of material in my own and other collections I can now state that *E. arbustorum* is widely distributed over eastern North America, as far west as Ohio, south to Virginia and north to Labrador. My own collection consists of more than a hundred specimens covering points within this range and I have examined as many more in other collections.

On corresponding with other dipterologists, I find that all of them who have collections from the region mentioned confess to having specimens of *arbustorum* confused with *meigenii*. Prof. J. S. Hine, of the Ohio State University, states that he has specimens from northern Ohio. Mr. Chas. W. Johnson, Director of the Museum of the Boston Society of Natural History informs me that he has specimens from all the New England states except Vermont and that this species is much more common than *meigenii*. Mr. E. T. Cresson, Jr.,

states that there are two female specimens in the collection of the Philadelphia Academy of Sciences. From Mr. H. S. Harbeck of Philadelphia I learn that he has ten specimens of *arbustorum* and that a friend took a series of twenty last summer. Mr. V. A. E. Daecke, of Harrisburg, Pa., writes that ten out of twelve from that region are *arbustorum*. Mr. Frederick Knab, of the U. S. National Museum, states that the species is now common about Washington, though the earliest records are for 1908.

The question has been raised by some of my correspondents as to the specific distinctness of these two species. Without doubt they are closely related, as may be judged from the amount of confusion recently existing in collections. They are so similar in size, form and general coloration that, without a careful examination, one would unhesitatingly place them together—as we all did!

The difference in extent of the velvety bands of the third and fourth abdominal segments is sufficient to separate the species, though in the males some familiarity with this character may be necessary. The differences in the abdominal markings are as follows:

First and second segment. Similar, with sexual differences only.

Third segment of male. Similar, though the velvety black bands are somewhat wider in *arbustorum* than in *meigenii*.

Fourth segment of male. Dissimilar; a distinct transverse band of velvet on the base of the segment and another, usually narrower, in front of the yellow posterior marginal band in *arbustorum*, while in *meigenii* the velvet is limited to a minute basal median spot (often wanting) and an occasional trace of the velvet black in front of the yellow hind border.

Third and fourth segments of female. Dissimilar; in *meigenii* these are entirely shining except for the occasional presence of a minute median basal spot of velvet and a mere trace of the same in front of the yellow hind border, while in *arbustorum* there are distinct bands of the velvet on the basal part of both segments as well as similar bands in front of the yellow hind border.

An easier character is found in the color of the basal joint of the tarsus of the middle legs. In *arbustorum* this joint is yellow or orange except at its extreme tip, which is sharply brown, while in *meigenii* the whole joint is dark brown like the rest of the leg.

It may be thought that these characters are unsatisfactory for the

separation of the species, yet in the examination of nearly 200 specimens of *arbustorum* and 100 of *meigenii* I have first separated them on the basis of the abdominal markings and then on the leg character and have found my determinations to agree in every case.

At first it occurred to me that these differences might be seasonal, indicating different broods, but the facts that the two species occur together and that both are found throughout the season preclude any such possibility.

Now it is of interest to note that in all the collections personally examined or reported to me there are no specimens dating back farther than 1906. This brings up the question whether *E. arbustorum* is a recent addition to our fauna or whether it has been here all the time and has been overlooked by all former students of the Syrphidæ. Obviously the answer to this question is not easy, unless one has sufficient faith in the infallibility of the older workers in this group. However, it would seem that if *arbustorum* is not a recent acquisition it should be found among the older collections, even if not properly identified. As this species does not, to my knowledge, appear in any of the older collections I believe the assumption is warranted that it has been introduced into America rather recently, has found the environment congenial and has spread rapidly and widely in a comparatively short time.

*E. arbustorum* occurs in Europe, N. Africa, Asia Minor and Siberia. The records at hand for the American distribution are as follows:

- New York.—Staten I. (Wm. T. Davis); Long I. (several collectors); Manhattan I. and the adjoining mainland (R. C. O.); South Lake and East Jewett, Catskill Mts. (Wm. T. Davis); Ithaca (Cornell Univ. Coll.); Carmell.
- New Jersey.—Palisade, Ft. Lee, Lakehurst and Ramsey (R. C. O.); Fairlawn and Sewall (E. L. Dickerson).
- Pennsylvania.—Philadelphia (H. S. Harbeck and V. A. E. Daecke); Swarthmore and Hazelton (E. T. Cresson, Jr.); Harrisburg (V. A. E. Daecke); White Mills.
- Maryland.—Baltimore (W. L. Dolly, Jr.); Lakeland and College Park (F. Knab); Bethesda (J. C. Crawford); Cabin John, Cabin John Bridge and Plummers Island (R. C. Shannon).
- District of Columbia.—Washington (F. Knab); Rock Creek (R. C. Shannon).

Virginia.—Hampton (J. Barlow); Norfolk (F. A. Johnson; Pimmit Run, Four Mile Run, Glen Carlyn and Falls Church (F. Knab).  
Ohio.—Newark (R. C. O.); Ira (J. S. Hine); Cincinnati (C. Dury).  
Connecticut.—Danbury (C. W. Johnson); Brookfield (E. L. Dickerson).

Rhode Island.—Buttonwoods (C. W. Johnson).

Massachusetts.—Forest Hills (Wm. T. Davis); Westport and Southbridge (C. W. Johnson); Framingham (C. A. Frost).

New Hampshire.—Fabyan (J. L. Zabriskie); Bretton Woods, Mt. Washington (C. W. Johnson).

Maine.—Ft. Kent and Eastport (C. W. Johnson); Orono (H. M. Parshley).

Ottawa.—Canada.

New Brunswick.—St. Johns (Geo. G. Engelhardt).

Labrador.—Battle Harbor (Geo. P. Engelhardt).

The first capture of *E. arbustorum* in America, as far as my information goes, dates from June 15, 1906, when a single female was taken by me at Ft. Lee, N. J. In 1908 a number of records appear, specimens having been taken by Barlow, Knab, Cresson and myself, and by 1909 the species apparently became common over a large part of its present range. The seasonal range, according to the records in my possession, is from April to October inclusive.

### ***Eristalis rupium* Fabricius.**

This species, which is also well known and widely distributed in Europe, is here recorded for North America for the first time. Six specimens, one male and five females, were recently sent me for identification by Mr. E. M. Anderson, of the Provincial Museum, Victoria, British Columbia. These were taken by Mr. Anderson at Atlin, B. C., near the Alaskan boundary and about 100 miles inland.

The well-marked brown spot on the middle of the wing will serve to distinguish *rupium* from other species of this genus in boreal America, except *E. bastardii* and *E. occidentalis* which are densely pilose species, and *E. saxorum* from which it differs by its smaller size, by the more reddish appearance of the male and the entirely shining third abdominal segment of the female.

***Eristalis nemorum* (Linne).**

In 1883 Van der Wulp (Tijdschr. v. Ent., XXV, p. 128) doubtfully recorded this species from Quebec, Canada. Ever since it has existed in catalogs of American diptera accompanied by a question mark. It now becomes my pleasant duty to remove this distasteful sign and to list the species as a widely distributed North American one, known positively from seven different localities, occurring both in the United States and Canada and ranging practically from coast to coast.

The first specimen to come to my attention was a male taken Aug. 31, 1904, at Vernon, B. C. (near Vancouver), by Mr. R. V. Harvey. While on a collecting trip into British Columbia in the summer of 1912 the writer took a male and a female specimen at Kaslo on July 11, and one female at Revelstoke on July 14. Mr. J. W. Cockle, of Kaslo, presented me with a male taken by him on May 7, 1910.

In recent correspondence Mr. Chas. W. Johnson informs me that there are in the Museum of the Boston Society of Natural History four specimens taken as follows: Newport, Vt., July 1, 1891 (A. P. Morse), Montreal, Canada, Sept. 1, 1905 (G. Beaulieu), Machias, Me., July 26, 1909, and St. Albans, Vt., June 21, 1912 (C. W. Johnson).

In North America there are now known five species of the genus *Eristalis* which occur also in Europe. These are:

- E. aenea* (Scopoli), widely distributed over both continents.
- E. arbustorum* Fabricius, widely distributed over Europe, northern Asia and into northern Africa, and here recorded for the first time as a common species in northeastern North America.
- E. nemorum* (Linne), common in Europe and well distributed, but apparently not common, in Canada and the northern New England states.
- E. astraceus* (Linne), described as *E. astriformis* by Walker from a single specimen taken in the Hudson's Bay Territory. It has recently been shown in Austen (Ent. Monthly Mag., 2 ser., vol. XXII, p. 63, Mch., 1911) that Walker's *astriformis* is identical with *astraceus*.

Apparently only the single specimen from Hudson's Bay, which is still in the British Museum, has ever been taken in America.

*E. rupium* Fabricius, a well-known European species, here recorded from northern British Columbia for the first time as a North American species.

*E. tenax* (Linne), now distributed over nearly the whole world, though formerly limited to the eastern hemisphere. The records for this species in North America go back only to 1870.

***Eristalis latifrons* Loew.**

This species has been considered as limited in its distribution to the western part in North America, where it has been listed from nearly all the western states east to Kansas, north into British Columbia and south into Mexico. During the summer of 1901 I took a number of specimens at Fargo, N. D., and supposed that this was about the eastern limit for the species. Later, on examining the collections in the American Museum of Natural History, I found specimens taken by Prof. W. M. Wheeler in Wisconsin. Within recent years, however, several specimens have been taken in the vicinity of New York City. The first of these, as far as my observations go, was taken near Brooklyn, N. Y., on July 15, 1908, by Mr. Geo. P. Engelhardt. Another was taken at Snake Hill, N. J., on July 16, 1911, by Mr. John A. Grossbeck, and I have seen others. These eastern specimens are indistinguishable from western ones.

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## THE DEER BOT-FLIES (GENUS *CEPHENOMYIA* LATR.)

BY J. M. ALDRICH,

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The discovery of adults of a North American species of *Cephenomyia* seems to justify some discussion of the history, taxonomy and biology of the genus:

There are four European species, all quite fully treated by Brauer in his classic "Monographie der Oestriden" of 1863. All live in the larval stages in the nasal passages, on the soft palate, at the base of the tongue, in the Eustachian tubes and pharynx of various members